

Application No. 10/049,843  
Reply dated June 2, 2004  
Response to Office Action dated February 5, 2004

### **REMARKS/ARGUMENT**

#### **Description of amendments**

Claims 1-37 are now pending and under examination. Applicant has amended claim 1 to replace the term “overlength” with a more descriptive term “extra length” and to provided antecedent basis for “the closing movement” and “the elastic deformation of the valve rod.” No new matter has been added.

#### **Interview summary**

Applicant’s attorney/counsel greatly appreciates the courtesy extended by Examiner Bui during the course of an interview conducted on May 12, 2004.

In the interview, Applicant’s counsel described the structure and operation of the claimed invention. Applicant’s counsel argued that the cited art does not disclose (1) a sealing surface, (2) an actuator stop surface, which is disposed at a distance from the actuator sealing surface, (3) a valve rod which, in relation to the distance between the sealing surface and the stop surface of the actuator has an overlength, wherein, during the closing movement, the overlength is taken up by the elastic deformation of the valve rod. Examiner asked that Applicant recites these arguments in this response.

#### **Allowed and allowable claims**

Applicant appreciates that the Examiner has indicated claims 16, 20, 33, and 37 would be allowable if they are rewritten to include all of the limitations of the base claim and any intervening claims.

#### **Objection to the specification**

The Examiner stated that the specification does not contain an abstract. Applicant respectfully disagrees because an abstract is provided in the international phase of the present application.

Application No. 10/049,843  
Reply dated June 2, 2004  
Response to Office Action dated February 5, 2004

Rejection under 35 U.S.C. §112, second paragraph

Claims 1-20 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant has amended the claims to overcome the rejection (see the amendments to claim 1).

Rejection under 35 U.S.C. §102

Claims 1-15, 17-19, 21-32, and 34-36 were rejected under 35 U.S.C. §102(b) as being anticipated by Baumgartner (U.S. Patent 6,161,813). For the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejection.

In prior art injection valves, as discussed in the interview and set forth in the background section of the present application, a valve actuator is used to open or close a valve opening to control the injection of fuel into the combustion chambers of the engine. To close the valve opening, a surface of the valve actuator contacts a sealing surface to seal the valve opening. In addition, the sealing surface functions as a stopping surface to stop the movement of the valve actuator towards the valve opening.

As discussed in the background section of the present application, a problem with this conventional arrangement is that the sealing surface and the stopping surface put contradictory demands on the size of the valve actuator's surface. The stopping surface demands a large actuator surface to reduce the impact when the stopping surface of the valve actuator collides with the sealing surface to stop the movement of the valve actuator. On the other hand, the sealing surface requires a small actuator surface to provide better sealing.

As discussed in the interview, the claimed invention solves the problem by providing the injection valve with two separate surfaces: an actuator stop surface (12a) and a sealing surface (13, 17). When the valve is closed, the movement of the valve actuator (12) is stopped by the actuator stop surface (12a). The valve actuator (12) itself does not close the

opening (14a); instead it pushes a valve rod (16) against the sealing surface (13, 17) so that a surface of the valve rod (16) closes the opening (14a).

This new arrangement requires that, when the valve opening (14a) is closed, the valve actuator (12) contacts the stop surface (12a) and the valve rod (16) contacts the sealing surface (13, 17). In order to ensure that when the valve actuator (12) is stopped by the actuator stop surface (12a), the valve rod (16) contacts the sealing surface (13, 17) to close the opening (14a), the valve rod (16) has a free length that is longer than the distance between the actuator stop surface (12a) and the sealing surface (13, 17). When the valve rod (16) is pushed by the valve actuator (12) against the sealing surface (13, 17) to close the opening (14a), the valve rod (16) is compressed so that its compressed length is equal to the distance between the actuator stop surface (12a) and the sealing surface (13, 17); as a result, it is ensured that, when the valve opening (14a) is closed, the valve actuator (12) contacts the stop surface (12a) and the valve rod (16) contacts the sealing surface (13, 17).

These features are not disclosed by Baumgartner. In fact, Baumgartner is exactly the same as prior art. For example, in Baumgartner, the contact between the valve seat (24) and the valve member (25) is used both to stop the movement of the valve member (25) and to seal the valve opening. Further, Baumgartner does not disclose a valve rod (16) that has a free length longer than the distance between an actuator stop surface (12a) and a sealing surface (13, 17) and that, when it is pushed by the valve actuator (12) against the sealing surface (13, 17) to close the opening (14a), is compressed so that its compressed length is equal to the distance between the actuator stop surface (12a) and the sealing surface (13, 17). Therefore, Baumgartner does not anticipate claims 1-15, 17-19, 21-32, and 34-36.

In light of the foregoing remarks, this application is considered to be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any

Application No. 10/049,843

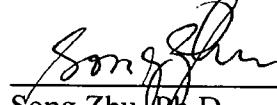
Reply dated June 2, 2004

Response to Office Action dated February 5, 2004

deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (CAM # 010816.50684US).

Respectfully submitted,

June 2, 2004

  
\_\_\_\_\_  
Song Zhu, Ph.D.  
Registration No. 44,420  
Donald D. Evenson  
Registration No. 26,160

CROWELL & MORING LLP  
Intellectual Property Group  
P.O. Box 14300  
Washington, DC 20044-4300  
Telephone No.: (202) 624-2500  
Facsimile No.: (202) 628-8844  
DDE:SZ:tjm (010816.50684US; 321430)